

WHAT IS CLAIMED IS:

1. A semiconductor device having a D/A converter, the D/A converter comprising:

four signal lines for supplying 2-bit digital signal;

four gradation voltage lines;

four first circuits, each of the first circuits connected to each of the gradation voltage lines in parallel,

wherein each of the first circuits comprises two P-channel transistors connected in series to each other and two N-channel transistors connected in series to each other.

2. A device according to claim 1, wherein the semiconductor device is a liquid crystal display device.

3. A device according to claim 1, wherein the semiconductor device is an electro-luminescence display device.

4. A device according to claim 1, wherein the semiconductor device is used in an electronic equipment selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation system, a personal computer, a note-sized computer, a portable information terminal, a mobile computer, and a portable telephone.

5. A semiconductor device having a D/A converter, the D/A converter comprising:

eight signal lines for supplying 4-bit digital signal;

sixteen gradation voltage lines;

sixteen first circuits, each of the first circuits connected to each of the gradation voltage lines in parallel,

wherein each of the first circuits comprises four P-channel transistors connected in series to each other and four N-channel transistors connected in series to each other.

6. A device according to claim 5, wherein the semiconductor device is a liquid crystal display device.

7. A device according to claim 5, wherein the semiconductor device is an electro-luminescence display device.

8. A device according to claim 5, wherein the semiconductor device is used in an electronic equipment selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation system, a personal computer, a note-sized computer, a portable information terminal, a mobile computer, and a portable telephone.

9. A semiconductor device having a D/A converter, the D/A converter comprising:

2n number of signal lines for supplying n-bit digital signal (n is an integer not less than 2);

2n number of gradation voltage lines;

2n number of first circuits connected to the 2n number of gradation voltage lines, respectively, wherein each of the first circuits comprises n number of P-channel transistors connected in series to each other and n number of N-channel transistors connected in series to each other; and

an output line connected to 2n-th first circuit.

10. A device according to claim 9, wherein the n-bit digital signal is supplied from latch circuits.

11. A device according to claim 9, wherein the 2n number of signal lines are connected to the gate electrodes of the n number of P-channel transistors and the n number of N-channel transistors, respectively.

12. A device according to claim 9, wherein the P-channel transistors and the N-channel transistors comprise a crystalline semiconductor layer formed over a substrate.

13. A device according to claim 9, wherein the D/A converter is formed over an insulating substrate having a pixel portion thereon.

14. A device according to claim 9, wherein the semiconductor device is a liquid crystal display device.

15. A device according to claim 9, wherein the semiconductor device is an electro-luminescence display device.

16. A device according to claim 9, wherein the semiconductor device is used in an electronic equipment selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation system, a personal computer, a note-sized computer, a portable information terminal, a mobile computer, and a portable telephone.

17. A semiconductor device having a D/A converter, comprising:

2n number of signal lines for supplying n-bit digital signal (n is an integer not less than 2);

2n number of gradation voltage lines;

2n number of first circuits, each of the first circuits comprising a second circuit comprising n number of P-channel transistors connected in series to each other and a third circuit comprising n number of N-channel transistors connected in series to each other, wherein the second circuit and the third circuit are connected in series to each other and each of first circuits are connected to each of the gradation voltage lines in parallel; and

an output line connected to a connection portion between the second circuit and the third circuit in each of the first circuits.

18. A device according to claim 17, wherein the n-bit digital signal is supplied from latch circuits.

19. A device according to claim 17, wherein the 2n number of signal lines are connected to the gate electrodes of the n number of P-channel transistors and the n number of N-channel transistors, respectively.

20. A device according to claim 17, wherein the P-channel transistors in the second circuit are formed by using a first semiconductor island, and the N-channel transistors in the second are formed by using a second semiconductor island.

21. A device according to claim 17, wherein the D/A converter is formed over an insulating substrate having a pixel portion thereon.

22. A device according to claim 17, wherein the semiconductor device is a liquid crystal display device.

23. A device according to claim 17, wherein the semiconductor device is an electro-luminescence display device.

24. A device according to claim 17, wherein the semiconductor device is used in an electronic equipment selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation system, a personal computer, a note-sized computer, a portable information terminal, a mobile computer, and a portable telephone.

25. A semiconductor device having a D/A converter, comprising:

2n number of signal lines for supplying n-bit digital signal (n is an integer not less than 2);

2n number of gradation voltage lines; and

2n number of first circuits, each of the first circuits comprising a second circuit comprising n number of P-channel transistors connected in series to each other and a third circuit comprising n number of N-channel transistors connected in series to each other,

wherein the second circuit and the third circuit are connected in series to each other, and each of first circuits are connected to each of the gradation voltage lines in parallel, and

wherein in adjacent two first circuits, an arrangement of the second

circuit and the third circuit is reversed between the adjacent first circuits.

26. A device according to claim 25, wherein the n-bit digital signal is supplied from latch circuits.

27. A device according to claim 25, wherein the $2n$ number of signal lines are connected to the gate electrodes of the n number of P-channel transistors and the n number of N-channel transistors, respectively.

28. A device according to claim 25, wherein the P-channel transistors in the second circuit are formed by using a first semiconductor island, and the N-channel transistors in the second are formed by using a second semiconductor island.

29. A device according to claim 25, wherein the D/A converter is formed over an insulating substrate having a pixel portion thereon.

30. A device according to claim 25, wherein the semiconductor device is a liquid crystal display device.

31. A device according to claim 25, wherein the semiconductor device is an electro-luminescence display device.

32. A device according to claim 25, wherein the semiconductor device is an electronic equipment selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation system, a personal computer, a note-sized computer, a portable information terminal, a mobile computer, and a portable telephone.

33. A semiconductor device having a D/A converter, comprising:
 $2n$ number of signal lines for supplying n-bit digital signal (n is an integer not less than 2);
 $2n$ number of gradation voltage lines; and
 $2n$ number of first circuits, each of the first circuits comprising a second

circuit comprising n number of P-channel transistors connected in series to each other and a third circuit comprising n number of N-channel transistors connected in series to each other,

wherein the second circuit and the third circuit are connected in series to each other, and each of first circuit is connected to each of the gradation voltage lines in parallel, and

wherein voltages supplied to the 2n number of gradation voltage lines become high in a direction from the first gradation voltage line to the 2n-th gradation voltage line.

34. A device according to claim 33, wherein the x-th ($1 \leq x \leq 2n$; x is an integer) gradation voltage line and the $(2n + 1 - x)$ -th gradation voltage line are paired and are adjacent to each other.

35. A device according to claim 33, wherein the n-bit digital signal is supplied from latch circuits.

36. A device according to claim 33, wherein the 2n number of signal lines are connected to the gate electrodes of the n number of P-channel transistors and the n number of N-channel transistors, respectively.

37. A device according to claim 33, wherein the P-channel transistors in the second circuit are formed by using a first semiconductor island, and the N-channel transistors in the second are formed by using a second semiconductor island.

38. A device according to claim 33, wherein the D/A converter is formed over an insulating substrate having a pixel portion thereon.

39. A device according to claim 33, wherein the semiconductor device is a liquid crystal display device.

40. A device according to claim 33, wherein the semiconductor device is an electro-luminescence display device.

41. A device according to claim 33, wherein the semiconductor device is an electronic equipment selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation system, a personal computer, a note-sized computer, a portable information terminal, a mobile computer, and a portable telephone.